

Remarks

The present application has claims 1, 2, 4, 5, 8 and 11-24 pending. Claims 11-19 have been withdrawn from consideration in the present application, but not yet canceled. Applicants have herein amended claim 1 and canceled claims 8 and 21. Accordingly, claims 1, 2, 4, 5, 20, and 22-24 are now under examination in the present application.

Support for the amendment of claim 1 may be found in the specification at page 5, lines 4-6, for the amendment to step (b) and in originally-filed claim 8 for the amendment to step (c).

In the May 11, 2010 Office Action, the Examiner rejected the pending claims under 35 USC §103 as obvious over Zuber, et al. (USP 6,156,449) in view of Yano (USP 5,380,806) and Tsai, et al. (USP 6,514,296) and Yoshino, et al. (US Pub. No. 2002/0048654 A1).

Applicants respectfully disagree with the Examiner's position, but nevertheless have amended claim 1 to further distinguish the cited references.

As stated in Applicants' earlier responses, the present invention provides an improved process for coating various substrates with water-based catalyst inks which, in part, involves controlling the humidity and temperature of the atmosphere under which the coating and leveling processes occur. The use of the present invention avoids the drawbacks of the prior art -- including, for instance, short screen life of ink, rapid evaporation of water, unstable ink viscosity, rapid ink drying, clogging of screen, low print quality, weak adhesion; etc. (see the specification, particularly page 4, lines 4-11). Additionally, the claimed process provides catalyst-coated substrates and MEAs that

have improved electrical performance in PEM fuel cells (see page 6, lines 1-6, and page 7, lines 12-13, of the specification).

Amended claim 1 now requires, *inter alia*, the controlling of humidity and temperature in the coating compartment to 60 to 100% relative humidity and 10 to 60°C and controlling the humidity and temperature in the leveling compartment to 60 to 100% relative humidity and 10 to 60°C. Additionally, claim 1 requires that the substrate and catalyst ink deposits be held in the leveling compartment under the recited conditions for a period of 1 to 10 minutes. These elements of the claimed invention are neither disclosed nor suggested by the cited prior art.

As admitted by the Examiner, the Zuber reference does not disclose or teach any leveling process – and certainly not the leveling of the catalyst ink deposits in a leveling compartment for 1 to 10 minutes at 60 to 100% relative humidity and a temperature of 10 to 60°C. In fact, Zuber does not even disclose a coating process under conditions of 60 to 100% relative humidity and a temperature of 10 to 60°C. Zuber is completely silent to any leveling of an ink and certainly is silent with respect to the conditions now set forth in amended claim 1.

The Examiner's reliance on the Yano reference to provide these missing teachings is misplaced. Yano, as stated in our previous responses, does not disclose a leveling step or process, but rather merely the use of a leveling agent in a totally different process.

Yano describes the effect that takes place when the concentration of a leveling agent is below 0.1 parts (see Yano, col. 6, lines 38-45):

“When the amount of the leveling agent is less than about 0.1 part by weight, a rough surface of the coating film attributed to the remainder of the foam generated at the time of the printing and the screen mesh is not sufficiently leveled, and pinholes are likely

to be fanned on the surface after drying and curing, so that the film tends to have a nonuniform thickness."

Yano does not teach or suggest holding the substrate and the deposited catalyst ink in a leveling compartment for 1 to 10 minutes wherein the relative humidity is 60 to 100% and the temperature is 10 to 60°C, as now required by claim 1.

Consequently, the combination of Zuber and Yano can not lead to the process of claim 1. At most, the combination of Zuber and Yano leads to the addition of a leveling agent to the catalyst ink in a concentration greater than 0.1 parts by weight. There is no teaching or suggestion in either reference or in their combination that would lead a skilled artisan to the application of a separate leveling process in a leveling compartment for 1 to 10 minutes under a relative humidity of 60 to 100% and a temperature of 10 to 60°C.

The Examiner also alleges that the Tsai reference teaches the importance of constant humidity and temperature in order to obtain an even coating. That may be, but this has nothing to do with the present invention. Tsai is directed to the manufacture of double-layer bipolar capacitors (see the field of invention). Tsai discloses a printing process for a two-component epoxy material having a useful life of about 30 minutes (see column 29, lines 44-53). Tsai does not disclose any catalyst inks, nor would one skilled in the industry even look to Tsai in attempting to address the shortcomings of Zuber.

Moreover, the wording "normally constant temperature and humidity are important to obtain an even coat" in Tsai refers to the epoxy printing process. This is because the epoxy starts curing at a specific temperature and has a short working time (see col. 20, lines 1-6, of Tsai). This wording has no bearing on the present invention and provides no guidance to one addressing the shortcomings of Zuber.

Moreover, the claims of the present application do not call for constant temperature or humidity. Nor would constant temperature and humidity necessarily prevent the evaporation of water or prevent the increase in viscosity of the ink deposits during the leveling process as the present invention does.

In sum, the Tsai reference (like Zuber and Yano) fails to disclose the actual limitations of the claimed invention – that is, coating a substrate with a water-based catalyst ink under 60 to 100 % relative humidity and a temperature in the range of 10 to 60°C and holding the substrate and deposited ink in a leveling compartment for 1 to 10 minutes under 60 to 100 % relative humidity and a temperature in the range of 10 to 60°C.

The claimed invention also has additional claim limitations not present in any of the cited art. For instance, claim 1, as amended herein, requires that the catalyst-coated substrate be dried at a temperature in the range of 40 to 150°C for 1 to 10 minutes. These claim limitations also are not taught or suggested by the cited prior art.

Lastly, the Yoshino reference was cited in connection with the surfactant limitation formerly present in claim 1 (now in dependent claim 24). The Yoshino reference has little or no bearing with respect to the limitations now present in amended claim 1.

In summary, none of the cited references, either alone or in combination, disclose, teach or suggest the claimed invention. In view of the foregoing remarks and amendments, reconsideration and withdrawal of the rejection under 35 USC §103 and allowance of the application are respectfully requested.

Applicant: HOHENTHANNER, *et al*
Serial No.: 10/627,238
Filed: July 24, 2003
Response to May 11, 2010 Office Action
November 11, 2010
Page 10

No fee is deemed due with respect to the filing of the present response, other than the fee for the requested three month extension of time. If any additional fees are due, or an overpayment has been made, please charge, or credit, our Deposit Account No. 11-0171 for such sum.

If the Examiner has any questions regarding the present application, the Examiner is cordially invited to contact Applicants' attorney at the telephone number provided below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John J. Santalone", written over a horizontal line.

John J. Santalone
Registration No.: 32,794
Attorney for Applicants
Tel.: (914) 873-1956